

CQ-TV



The Journal
of the

no.54

British Amateur
Television Club

THE BRITISH AMATEUR TELEVISION CLUB



Editor: C. F. E. Lacaille,
2, Pasture Road,
Wembley, Middlesex.

President: S. N. Watson M.I.E.E.
Post President: G. B. Townsend, B.Sc., F.Inst.P., A.M.I.E.E.
Chairman: J. Ware.
Hon. Secretary: J. E. Tanner
Hon. Treasurer: M. Sparrow
Librarian: C. G. Dixon
Pub. Offr.: M. H. Cox

photos:- (left) from left to right Michael Cox, John Tanner, John Ware, G. B. Townsend, Malcolm Sparrow, Grant Dixon (behind M. Sparrow) and Ian Waters.

(below) some of the equipment on display at the 1964 convention.

(cover) Grant Dixon demonstrates his slow scan equipment.

More convention photos in the central pages. Photos by Vic Cedar and Charles Lacaille.

For Sale

Members have asked us to advertise the following items:-

- (1) M. Bues 960PB/T of 6L, Shawley Way, Epsom Downs, Surrey, has for sale:-

- (a) An APQ 9 radar jammer unit complete with valves and 931A photo multiplier.
- (b) A test set TS-184A/AP, a cavity wavemeter modified to cover 420 to 450 mc/s.

Price £3 each o.n.o. Buyers collect.

- (2) R. W. Martin of 3, Buckingham Road, Tuebrook, Liverpool 13, has for sale:-

- (a) A 931A photo multiplier 30/-
 - (b) A Cathodeoxal 12.029166 mc/s. 003% 7/6d.
- or best offers - post free.

- (3) J. C. Taylor of 23 Marlborough Road, Royton Lanes., has for sale:-

The transmitter unit for an APQ 9 radar jammer, complete but minus its gears and blower, otherwise untouched. Any offers?

Incidentally, J. C. Taylor would like to know if any members has tried pseudo-random scanning as mentioned in 'Electronics' some time ago.



Convention '64

The 1964 Convention of the B.A.T.C. was held in the conference rooms of the I.T.A. at 70 Brompton Road, London S.W.3. on Saturday, September 12th. It was an experiment to move from Conway Hall, but the improved surroundings and parking facilities and most excellent co-operation of the I.T.A. made the move worth while.

One slight disadvantage was the limit on the size of equipment that could be displayed. Despite this, 3" Image Orthicon cameras were shown by Terry Lane and John Tanner and Grant Dixon had his slow scan equipment on display. Among the other equipment was Andrew Tucker's vidicon and several fully transistorised pulse generators one of them built by the City and Guild's Radio Society.

In the afternoon, three lectures were given. John Noakes spoke about pulse generators. Michael Cox discussed video testing techniques, including the application of pulse and bar and other test signals. John Tanner had set himself the task of describing the operation of camera tubes but unfortunately because of shortage of time he was restricted to five minutes in which he gave a lightning and enlightening description of vidicon and image orthicon camera tubes.

The afternoon also saw the general meeting at which the main business was the election of the committee and the examination of the financial state of the Club. Unfortunately, our new President Mr. Watson was unable to attend and his place was taken by Mr. Townsend our immediate past President.

One of the outstanding features of the day was the lecture transmitted over the air on the 70cm. band, sound and vision from Wembley, given by David Mann on the use of semi-conductors in 70cm. equipment. The picture was displayed on two receivers kindly loaned by Messrs. Audio and Video rentals Ltd. These pictures were received under great difficulty as the loss on the down lead was so great that three transistorised pre-amps had to be used before the signal was usable.

Earlier, members had the opportunity of purchasing at bargain prices equipment which had been donated to the Club by Pye.

During the afternoon, a draw was held of more donated equipment including a box full of old vidicons presented by C. Davies. The first prize, a separated mesh one inch vidicon presented by E. E. V. went to the City and Guild Radio Society.

Michael Cox has asked us to express his thanks to all those who helped to run the catering and also to those who brought equipment, and also of course our thanks to Michael Cox who organised the Convention.

C. F. L.

70cm.

Mast Head Preamplifier

by I. M. Waters G3KKD/T

It is well known that a high gain aerial system and a low noise receiver front end are essential for the effective reception of UHF signals. While the best signal to noise ratio possible is desirable for communications working, it is quite essential to obtain the ultimate when receiving 70 cm. Amateur Television pictures.

The gain of the aerial system used by the writer is limited by the size of array that can be safely supported by the 60 ft. mast that is necessary to enable the aerial to "see out" over the tall buildings immediately surrounding it. This is in practice about 12 dB given by an array of 16 quarter wave driven elements, with a wire mesh reflector.

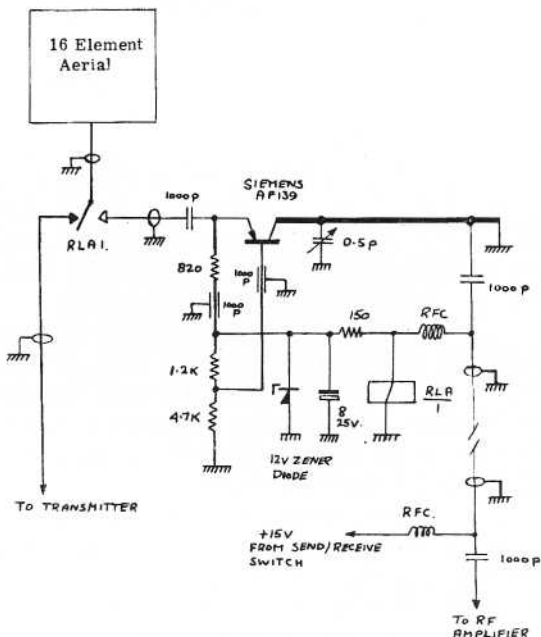
Attention has therefore been directed towards the best low noise amplification possible. Fig. 2 shows a Television picture received from G3REH/T with the original arrangements, at the writer's station. The associated waveform monitor display showing a peak noise to peak signal ratio of approximately 30% is given in Fig. 3.

Originally, the equipment consisted of the above aerial with 60ft. of coaxial feeder (B.I.C.C. Type T3032, matched loss about 2.5 dB at 430 mc/s) feeding into a cascode R.F. amplifier of the G.E.C. design employing the A. 2599 and A. 2521 valves. This amplifier is known to have a noise figure of about 8 dB at this frequency. The gain is such that the noise figure of the following crystal mixer, etc does not contribute significantly to the overall performance, although the bandwidth of the following vision I.F. amplifier is restricted to about - 3dB at 2.5 mc/s.

It had been realised for some time that results could be improved if the 2.5 dB "input attenuator" in the form of the feeder could be avoided by placing the pre-amplifier at the top of the mast. However, the problems of power supply, and of enabling the station to transmit as well as receive, together with the weight load limitations at the top of a 60ft. pole deterred further progress.

With the advent of transistors capable of both gain and noise figures superior to any available valves, a mast head preamp. has now been constructed, the details of which are given in Fig. 1. The basic amplifier is similar to that described by D. Mann G3OUO/T in CQTV No. 51 except for the use of the more recent, and considerably better Siemens AF139 transistor.

There is little special about the amplifier itself, but the method of operation together with the aerial changeover relay at the top of the mast may be of interest. The amplifier is assembled together with the changeover relay (one half of an ex-government Type 78A) in a polythene lunch box which is fitted to the rear of the aerial. Two feeders connect this



assembly to the shack; one the original length of T3032 is used on transmission while the other, a somewhat less expensive cellular polythene T.V. down lead cable connects the output of the amplifier directly to the input of the original valve preamplifier. The relay is de-energised on transmit, and in this condition it connects the TX directly via the original feeder to the aerial. On reception a positive 15 volt D.C. supply is passed via the receive coax. to operate the relay, and to power the amplifier. Smoothing circuits and a 12 v zener diode are interposed in the amplifier supply. The gain of the preamplifier is such that the lower quality feeder cable, having a higher loss may be used on the receive circuit without worsening the overall noise performance. Initially there was some doubt as to whether the Rf leakage across the relay when transmitting would damage the transistor, since with a 150 w input to the final of the TX it is estimated that, allowing for transmitter efficiency and feeder loss up to 75 w of Rf. may be flowing through the relay.

It will be noted that the supply voltage is automatically removed from the transistor when transmitting. Trials were run with the aerial assembly on the ground, measuring the rectified current in the transistor emitter-base junction as the Rf power was slowly increased. It was found that by adjusting the length of the coax. cable connecting the relay to the transistor emitter, a rectified current of less than 1μA could be obtained with approximately 4" of cable in circuit, when transmitting at full power.

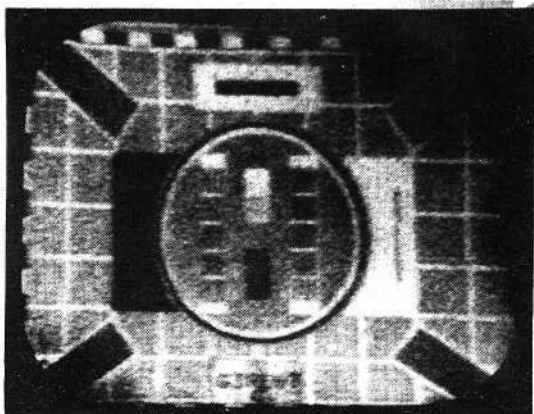


Fig 3

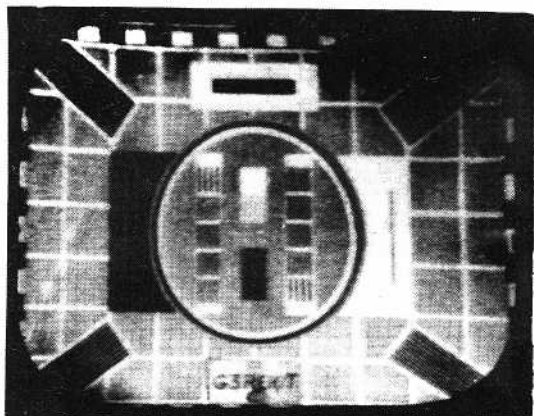


Fig 4

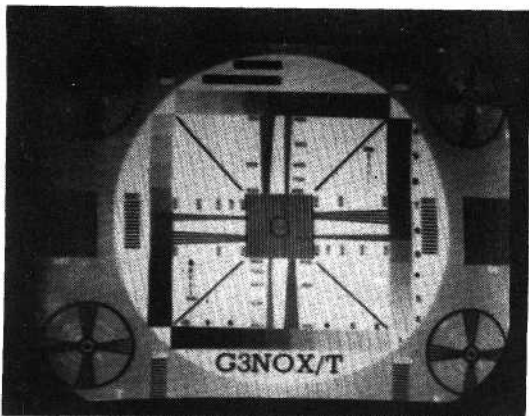
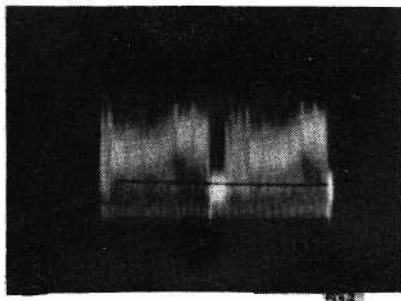


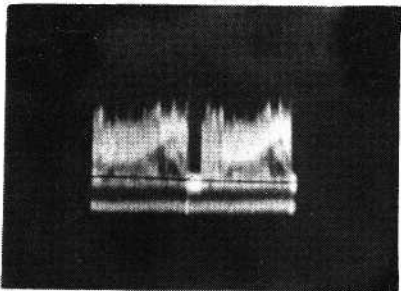
Fig 5



It will also be seen that in the event of the pre-amplifier failing the relay at the mast head remains de-energised, and the station may be worked normally over the original feeder, using a second send-receive relay in the shack. Fig. 4 shows the same transmission from G3REH/T with the mast head system in use. The associated waveform display is shown in Fig. 5. It will be seen that the peak noise has now decreased to about 15% i.e. about half the 30% sync. pulse amplitude. This implies an improvement of 2 to 1 in voltage ratio, or 6dB, which is accounted for by the removal of the 2.5 dB feeder loss, and the improved transistor noise figure compared with the original valve preamplifier.

Fig. 6 shows the results obtained when using the preamplifier to receive pictures from G3NOX/T with an ERP of about 4.5 kw peak white over a rather less favourable path of 28 miles.

It may therefore be concluded that the design is successful, and considerably improves the quality of amateur Television (and 'phone) reception for a very modest outlay.



Signals from G3REH/T were chosen for these trials since that station is currently running at low power and is 24 miles distant from the writer's station. The details are 6 watts D.C. input to a TV grid modulated 6J6 power doubler. The estimated ERP allowing for transmitter efficiency, feeder loss, and the gain of the 64 element stack used, is about 15 watts peak white. The aerial is about 80 feet above sea level, and the path is over flat fen land.

The writer wishes to acknowledge the cooperation of stations in the East Anglian TV Net in preparing this article.

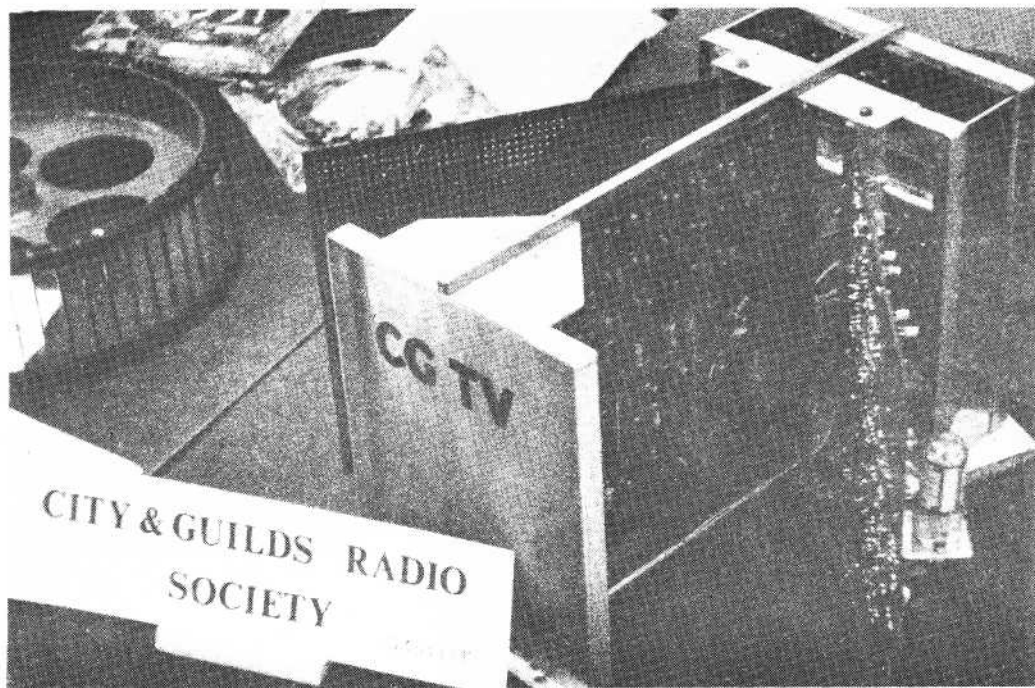
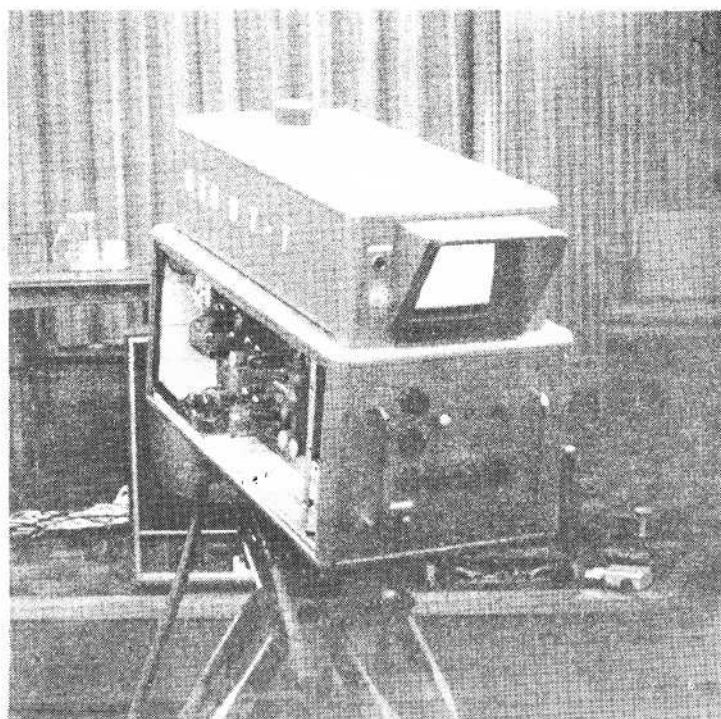


Top left: a film cameraman preparing 'Time Out', the B.B.C. 2 programme. Top centre: Terry Lane adjust his image Orthicon camera. Top right: a man is to his left in the background. Below right: a man is for the general meeting. Below right: a society pulse generator





Preparing to shoot an insert for
programme. Top right; John Tanner's
centre; Andrew Tucker left helps
with the vidicon. Andrew Tucker's
Below left; Members assembling
Now right; The City and Guild's radio



Dagenham Town Show



reported

by

David Mann

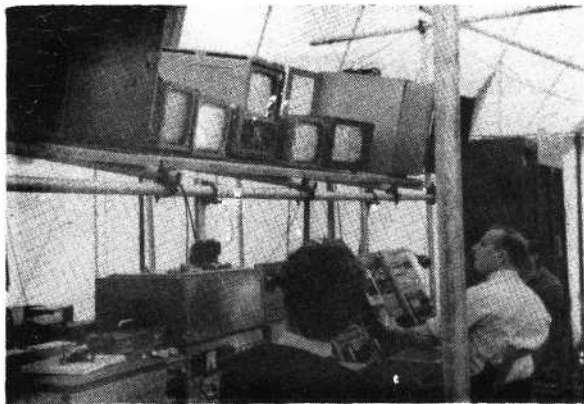
G3ouo/T

Once again Chelmsford Group represented the B.A.T.C. at the Dagenham Town Show with a very ambitious demonstration of colour and monochrome television. The equipment was set up in a large tent, the stage and gear occupying one half and the audience the other half.

On the monochrome side two cameras were used, Martin Lilley's $4\frac{1}{2}$ inch image orthicon and Terry Lane's 3 inch image orthicon. A flying spot scanner and a monoscope were used to provide captions. These fed several monitors distributed around the tent.

Programme material included local pop groups who played to a very enthusiastic audience. The gaps between the items were filled by turning the cameras on the audience who generally thought it great fun to be on television.

Turning now to the colour side, pictures consisting of films and slides were provided by the B.B.C. who ran the longest colour transmission specially for the demonstration. A darkened enclosure housed three colour receivers. Martin Lilley's set received the picture on channel 33 and distributed sound and vision to the other two, provided by John Ware and Chelmsford Technical College. It was estimated that 1,500 people saw colour television for the first time at this demonstration, which must have been one of the highlights of the show.



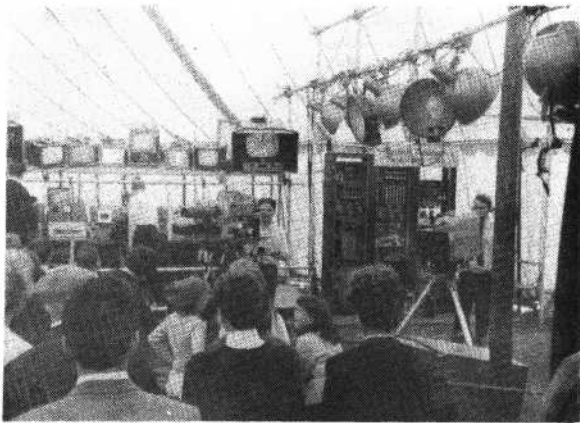
AMATEUR T.V.

On Thursday, 22nd October, 1964 a Lecture on The History and Growth of Amateur Television with demonstrations was given at the University College of North Wales, Bangor by John Lawrence, GW3JGA/T.

This lecture was the Presidential Address to the U.C.N.W. Amateur Radio Society and had a record attendance of over 100 members and friends.

The demonstrations included a flying spot scanning system and a field sequential colour monitor. Excellent transmitted pictures were provided by a random interlace transistorised vidicon camera from the Physics department $\frac{1}{2}$ of a mile away on 432.6 mc/s. These were received and displayed on a 19" monitor in the lecture theatre. The accompanying T.V. Sound was transmitted on 145.43 mc/s and talk back was provided on 3.65 mc/s.

Behind the scenes assistance and manning of the various radio links was provided by Alan Jubb GW3PMR, Rob Dilworth GW3NWD and Peter Symes GW3SWL.



PROFESSIONAL

lettering

by Ian. D. Hillson

A Problem that faces amateurs at some time or another is how to produce professional-looking labels for use on control panels and caption boards. An item, no matter how well made, can be branded 'home-made' by people, in most cases because of its appearance externally. Manufacturers of equipment have expensive machines at their disposal to produce labels on control panels. Television Companies employ artists to produce caption boards. Because of the costs involved, amateurs have had to label these items themselves instead of paying for the job to be done by a professional. The results of these attempts usually leave a lot to be desired because of the difficulty in drawing each letter freehand. Luckily, there are methods of producing professional-looking lettering simply.

The simplest of these methods comes in the form of a sheet of letters which can be transferred to any surface very easily. It is only a matter of selecting the required letter or symbol and transferring it. The most well-known of this type are 'the Radio Constructor' panel sign transfers available from Data Publications Ltd., 57 Maida Vale, London W.9. or through amateur radio shops. The above come in the form of white or black standard size wording, and white or white on black dials for potentiometers, etc.

These are affixed in the following manner. The wording or panel required is cut out of the sheet and the backing paper removed. The gummed side of the sheet is moistened and placed in position. The air bubbles are pressed out and the transfer left to dry. It is then wetted and removed leaving the wording or dial stuck to the panel. Added protection may be given by giving the transfer a coat of clear nail varnish.

The other type of transfer is known as 'Letraset instant lettering' and details are available from Letraset Ltd., Valentine Place, Webber Street, London S.E.1. These transfers also come in the form of sheets of letters and numbers (but not technical wording as with the previous type). Symbols and arrows are also available. To affix a letter the backing paper is removed from the sheet, the desired letter placed in the required position and the back of the transfer rubbed with a pencil or ball point pen. The backing is then removed leaving the letter on the surface.

The makers claim that the letters can be put on any smooth surface. The letters are available in dozens of different styles and sizes as well as in colour and black on white. This makes them ideal for making caption boards and transparencies for television systems (both black and white and colour) as well as for labelling controls etc. The various prices of sheets 15" x 10" are 7/6 each, 10/- set of two and 15/- set of three depending upon size and type of

Profil

ABC1

Fortune

ABCa

letters. A good general purpose lettering is known as 'Grotesque' and comes in various sizes and proportions as well as colours. Other types which may be found useful are as follows:

'Profil' gives a 3 dimensional effect. 'Brushscript', 'Flash' and 'Mistral' (the last especially) are freehand and normal writing type of letters. All are available in different sizes and colours.

Many other types of letters are available but a simple design such as 'Fortune Extra Bold' and 'Grotesque' can be used for many different types of caption.

I hope that these notes provide useful advice on a rather unusual subject.

Brush

ABCabc

Flash

ABCDabc

Mistral

ABCDabc

Grotesque

ABCabc

from the post bag

Compiled by D. Mann G30U0/T.

After the enthusiasm of the convention our post bag has been as full as ever. Earlier this summer we were pleased to meet Don Miller (W9NTP) and his wife who were passing through London on their way back to the U.S.A. During their stay they were able to meet Jeremy Royle (G3NOX/T), John Tanner (G3NDT/T) and the writer (G30U0/T). Don is now active on 70 cm. at home and he reports that extremely strong signals have been exchanged over a 40 mile path. Initially, tests were made with sound only but vision transmissions should follow.

Another visitor from overseas was Harry Grimbergen (PAQLQ), who visited G3NDT/T and G30U0/T. Still on the subject of travel we wish all the best to Dave Cox C6AAJ/T who is emigrating to Durban. Before he left he had a T.V. set working on 70 cm. receiving several local stations.

From Belguin we hear that W. Van Mark (ON4RT) has a triple standard receiver working on 70 cm. 405, 625 and 819 lines using a transistor converter and pre-amp which is fed from a 48 element stack aerial array. He would like to make regular tests with anyone who has a good location for transmitting to the east and will reply on 2m. or 80 m. S.S.B. His address is Sabina Van Beierenlaan 3, Zottegem, Belgium.

Now from Holland PAQLQ in The Hague has sent pictures to G3REH/T in Lincolnshire, a distance of about 200 miles. Regular contacts continue about every day with G3LQR/T usually on sound, but in vision also when conditions permit.

In Plymouth, Harold Jones (G5ZT) and Fred Chubb (G3ARE/T) are now regularly transmitting television on 70 c.m. and recently Fred gave an over the air lecture to the Plymouth radio club who met at the home of G5ZT. The lecture described a complete television chain and lasted about 2 hours; quite an achievement for a one man effort at the transmitting end. Both G2BCB and G3SN have receivers working on 70 cm. and have had pictures from G5ZT/T and G3ARE/T. Much of this news comes from Roger Davey (G3PGJ) who would like to hear from any other members in the Plymouth area. His address is 85, Beaconsfield Road, Beacon Park, Plymouth, Devon.

G6AAH/T of Gosport, Hampshire is now radiating vision on 70 cm. using a QQV03-20A tripler. He has heard from F8MX and G3NOX/T with the aid of a new AF186 transistor pre-amp.

The only news from Wales this time comes from R. Perry (GW30AC/T) of Anglesey who is building a vidicon camera using transistors and also a 150 W transmitter for 70 cm.

In Northern Ireland, D.W. Dillon who has recently joined the club, has a S.P.G. virtually complete and is about to start on a camera.

Jeremy Royle (G3NOX/T) of Saffron Walden has added a 3" image orthicon camera and vision mixer to his equipment. Recent contacts with 70 cm. include yet another contact with G3ILD/T at Darlington, this time simultaneous sound and vision was worked both ways. This is thought to be a record for such a contact. Other activities include an over the air lecture to the Cambridge Radio Club. The lecture was given in two parts, the first told the history of the B.A.T.C. and the development of amateur television;

the second part consisted of a tour and description of the apparatus. Also recently Jeremy Royle's station, together with Ian Water's station was featured in a programme on "Anglia Television". The programme gave a description of amateur television as a hobby as well as showing the two stations actually in contact over the air. It is hoped to obtain a film recording of this programme for B.A.T.C. use. Jeremy is also radiating test transmissions every evening from 9.0. to 9.30. p.m. with vision on 436 Mc/s., sound on 432.5 Mc/s., beamed due north.

Tom Ruddersdon of Ely is building a vidicon camera with the tube he won at the convention raffle. He has also been receiving pictures from some local stations on 70 cm.

J. Rose (G3ST0/T) and A. Taylor (G30SB) of Lincoln both share a F.S.S. working, and they are about to try two way vision on 70 cm.

D. Richardson G3PGR has moved house to Rugby. He has a first class site 400 ft. A.S.L. and should be receiving on 70 cm. by the time this appears.

R. Field of Bourne End, Bucks., has almost completed a vidicon camera.

C. Greenwood of 9, Barford Close, Hendon, London N.W.4. is experimenting with colour T.V. and would like to hear from any other members with a similar interest.

P. Sado of Flat 3, 18, Grosvenor Square, London W.1. would also like to hear from any members in his area.

Alan Bird of Wembley, Middlesex is now licensed as G6AAQ/T and has had a two way vision contact with G30U0/T. His equipment consists of a QQ V03-20 tripler in the transmitter output with a F.S.S. as the picture source.

Our Chairman John Ware G3RSA/T is now on the air in London, and has contacted all the London amateur television stations. A vidicon camera is under construction together with a 4X150A amplifier for his transmitter.

Dave Buck G6PJE/T has recently moved his station to London where several contacts of a transistor S.P.G. and vidicon camera with a 4X150A in the transmitter output. Dave ran the stand at this year's Radio Communication Exhibition where several pieces of equipment were on show including three vidicon cameras. Although somewhat overshadowed by the convention, this exhibition continues to be an annual meeting place for many B.A.T.C. members.

M. Bues G60PB/T is building a vidicon camera to replace his iconoscope. During a period of good propagation conditions, he almost received a picture from G3ILD/T at Darlington (230 miles) but the signal was not quite strong enough. Better luck next time.

M. Day G3SZL/T of South London has almost completed a transmitter for 70 cm. and he may well be on the air by the time this appears in print.

With that we end the news for this edition. Please send all reports for our next issue to the Hon. Sec., Editor, or any committee member.

Slow Scan Television

Grant Dixon is now in a position to supply and receive tape on the following standard.

F.M. 5 kc/s narrow band with large sync pulses, to 3 kc/s negative modulation.

Line time base 50 c/s.

Frame time base about 3½ seconds.

He is also in a position to receive :

A.M. negative modulation similar to WA2 BCW tapes but does not record on this standard.

Details from Grant Dixon.

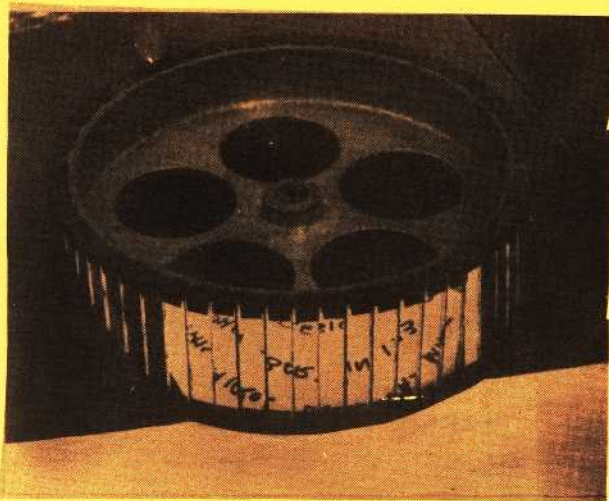
Grant Dixon now has available a lecture tape on slow scan. This is recorded at $3\frac{3}{4}$ ins. per second and comes on a 5 inch spool. Grant Dixon also has back copies of the Mullan Technical sheets.

Plastic Badges

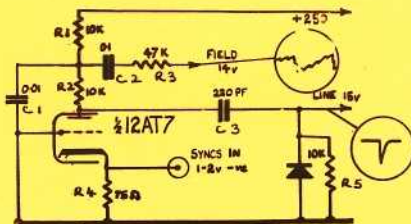
Members will be interested to know that an order has been placed to have plastic badges made similar in design to the lapel badge. These will be suitable for mounting on equipment and the approximate size will be 3½" x 2" measured diagonally. The cost will be about 1/6 post free. These should be available soon. Further details will be given in CQ 55.

Puzzle Picture.

For those of you who were unable to attend the convention, here is a puzzle picture. What is it? Solution and write-up in our next edition. Sorry no Prizes!



This shows John Tanner giving an over the air lecture to the Radio Society of Harrow. See CQ-TV 53.

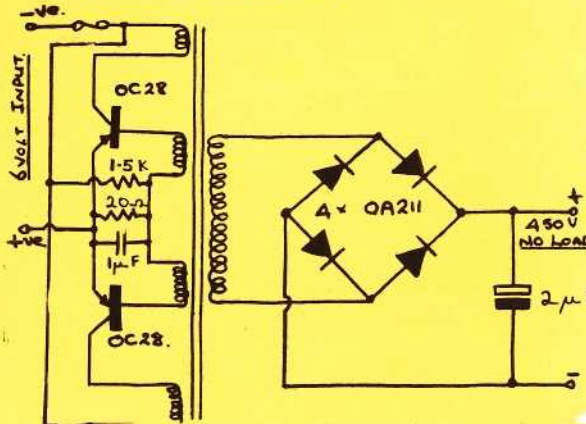


Grounded Grid Sync Separator

Peter Johnson contributed this circuit which he tells us works very well in his camera:

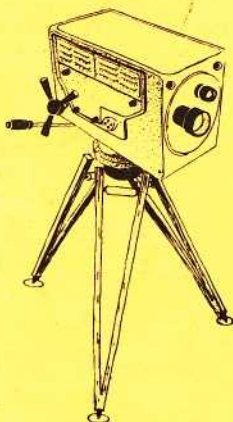
The grounded grid sync separator provides negative going line and field pulses of about 15 volts amplitude given an input of composite syncs of between 1-2 volts of the same polarity which is fed to the cathode. The output from the anode is differentiated by C₃ R₅ and clipped to provide line information and integrated by C₁ R₄ to provide field information.

In the last edition of CQ-TV we omitted certain component values in the circuit for an H.T. supply for a transistorised camera. Here it is again with full details.



EMI

OPPORTUNITIES IN
RESEARCH



**CENTRAL RESEACH
LABORATORIES OF
ELECTRIC & MUSICAL
INDUSTRIES LTD.
Hayes, Middlesex**

is expanding and offers attractive posts

PHYSICISTS AND ELECTRONIC ENGINEERS

preferably with some knowledge and experience of :-
Advance television circuitry . Experience of colour tele-
vision a distinct advantage. Wide-band, feed-back, and
low-noise amplifiers. Scanning circuits. Power supplies.
Knowledge of spectral measurement of photo-devices
would be an advantage.

Group Personnel Manager, O4213/F. E.M.I. Limited, Blyth Road, Hayes, Middlesex.
